APPENDIX C-2

MASTER DRILLING PROGRAM

OPERATOR: Petroleum Development Corporation (Pedco)
Carbon County, Wyoming
Section 17 T16N, R91W, 6th PM
BLM Leases: WYW126439, WYW131778

Drilling Program for the subject wells listed below:

1. Federal 1691-2-17
2. Federal 1691-6-17
3. Federal 1691-10-17
4. Federal 1691-14-17
5. Federal 1691-16-17

1. AVERAGE ESTIMATED TOPS OF IMPORTANT GEOLOGIC MARKERS:

Formation	Depth
Lewis Shale	Surface
Almond	+/- 586'
Pine Ridge	+/- 881'
Allen Ridge	+/- 1136'
TD	+/- 1600'

2. ESTIMATED DEPTH OF ANTICIPATED WATER, OIL, GAS OR MINERAL FORMATIONS:

Almond	Methane gas
Allen Ridge	Methane gas

The Lewis Shale is not anticipated to contain any zones capable of producing water. There are several zones within the Mesaverde capable of producing fresh water, including the coal seams. Several coal seams may be tested for gas producing formations to total depth. All shallow water zones will be protected with casing and cement. Cement will be brought above the base of the Lewis Shale to isolate all formations in the Mesaverde Group.

Planned Objective: Mesaverde

3. MINIMUM BOP REQUIREMENTS: - refer to attached BOP schematics

1. The BOPE shall be closed whenever the well is unattended.
2. The BOPE shall be pressure tested when initially installed, whenever any seal subject to pressure testing is broken, after repairs, or every 30 days.
3. PEDCO shall notify the Rawlins BLM office 4 hours prior to the BOPE test.

4. SUPPLEMENTARY INFORMATION:

The primary objective of this project is to drill, stimulate, and produce coalbed methane gas from the coal seams of the Mesaverde Formation.

PEDCO proposes to test the Mesaverde coals between 586' and 1600'. Stimulation of the perforated coal seams will be done by hydraulic fracturing. Fresh water, gelled water, and/or foam fracturing techniques will be used.

Please see the attached schematics for **Typical CBM Drill Site Layout**, **Configuration Options, Typical CBM Completed Well**, and **Typical CBM Well Site.**

5. CASING PROGRAM:

Hole Size	Casing Size	Casing Wt.	Grade	Joint	Depth Set	New/Used	Rng
13 1/2"	10 ¾"	32.75#	H-40	ST&C	0-160	New	3
9 7/8"	7"	23#	MC-50	LT&C	0-TD	New	3

Surface Casing:	10 ¾"	32.75 ppf.	H-40	STC	Collapse	Burst	Tension
				Ratings:	880	1820	205M

A. Burst = [0.052 * FG * TVD(shoe)] – [Gas Gradient * TVD]
= [0.052 * 9.3ppg * 160'] – [0.1psi/ft * 160']
= 61.38psi
Safety Factor = Rating/Burst
= 1820/61.38
= 29.65

B. Collapse = 0.052 * MW * TVD(shoe)
= 0.052 * 8.8ppg * 160'
= 73.22psi
Safety Factor = Rating/Collapse
= 880/73.22
= 12.02

C. Tension = Weight * MD * [1 – (MW/65.5ppg)]
= 32.75ppf * 160' * [1 – (8.8ppg/65.5ppg)]
= 4558.8 lbs.
Safety Factor = Rating/Tension
= 205,000/4558.8
= 44.97

Surface casing shall have centralizers on the bottom 3 joints of the casing, starting with the shoe joint.

Production Casing:	7"	23 ppf.	MC-50	STC	Collapse	Burst	Tension
				Ratings:	3110	3960	273M

A. Burst = [0.052 * 8.4ppg * 1600'] – [0.1psi/ft * 1600']
= 538.88psi
Safety Factor = Rating/Burst
= 3960/538.88
= 7.35

B. Collapse = 0.052 * 12.5ppg * 1600'
= 1040psi
Safety Factor = Rating/Collapse
= 3110/1040
= 2.99

C. Tension weight = 23lbs./ft * 1600' * [1 – (12.5ppg/65.5ppg)]
= 23lbs./ft * 1600' * .8092
= 29,778.56 lbs.
Safety Factor = Rating/Tension
= 273,000/29,778.56
= 9.17

6. MUD PROGRAM:

Drilling mud will be used by the circulation medium. A fresh water, polymer, gel drilling mud will be used and visual monitoring will be done from spud to total depth. The anticipated mud weight will be between 8.5 – 13 ppg. Sufficient quantities of lost circulation material and barite will be available at the well site at all times for the purpose of assuring well control.

7. CEMENTING PROGRAM:

The following is the proposed procedure for cementing the 10 ¾" surface pipe and 7" long string:

Surface Casing:

Lead: Class "C" Type III, 14.4 ppg., yield 1.44ft^3/sk @ 101% excess. Compressive strength in 24 hours at 80°F 3100psi.

The surface casing shall be cemented back to surface. In the event cement does not circulate to surface or fall back of the cement column occurs, remedial cementing shall be done to cement the casing back to surface.

Long String:

Lead: Class "C" Type III, 14.4 ppg., yield 1.44ft^3/sk @ 35% excess. Compressive strength in 24 hours at 95°F 3200psi.

Estimated top of cement back to surface.

8. LOGGING PROGRAM:

Cores: Rotary Cores will be taken as needed to evaluate the coal seams.

DST's: None Planned

Logs: Induction, GR, SP, Density, Neutron and Caliper – From surface to TD
Cement Bond Log – From 10 ¾"casing shoe TD
Mud Logger – As Needed.

9. PRESSURE DATA, POTENTIAL HAZARDS:

Bottom hole pressures anticipated @ 1000 – 1100 psi.
There is no history of hydrogen sulfide gas in the area and none is anticipated.

10. ANTICIPATED STARTING DATES AND NOTIFICATION OF OPERATIONS:

A. Anticipated Starting Dates:

Anticipated Commencement Date	- Summer 2001, or upon approval
Drilling Days	- Approximately 7 Days/Per Well
Completion Days	- Approximately 2 Days/Per Well
Testing Days	- Approximately 7-14 Days/Per Well

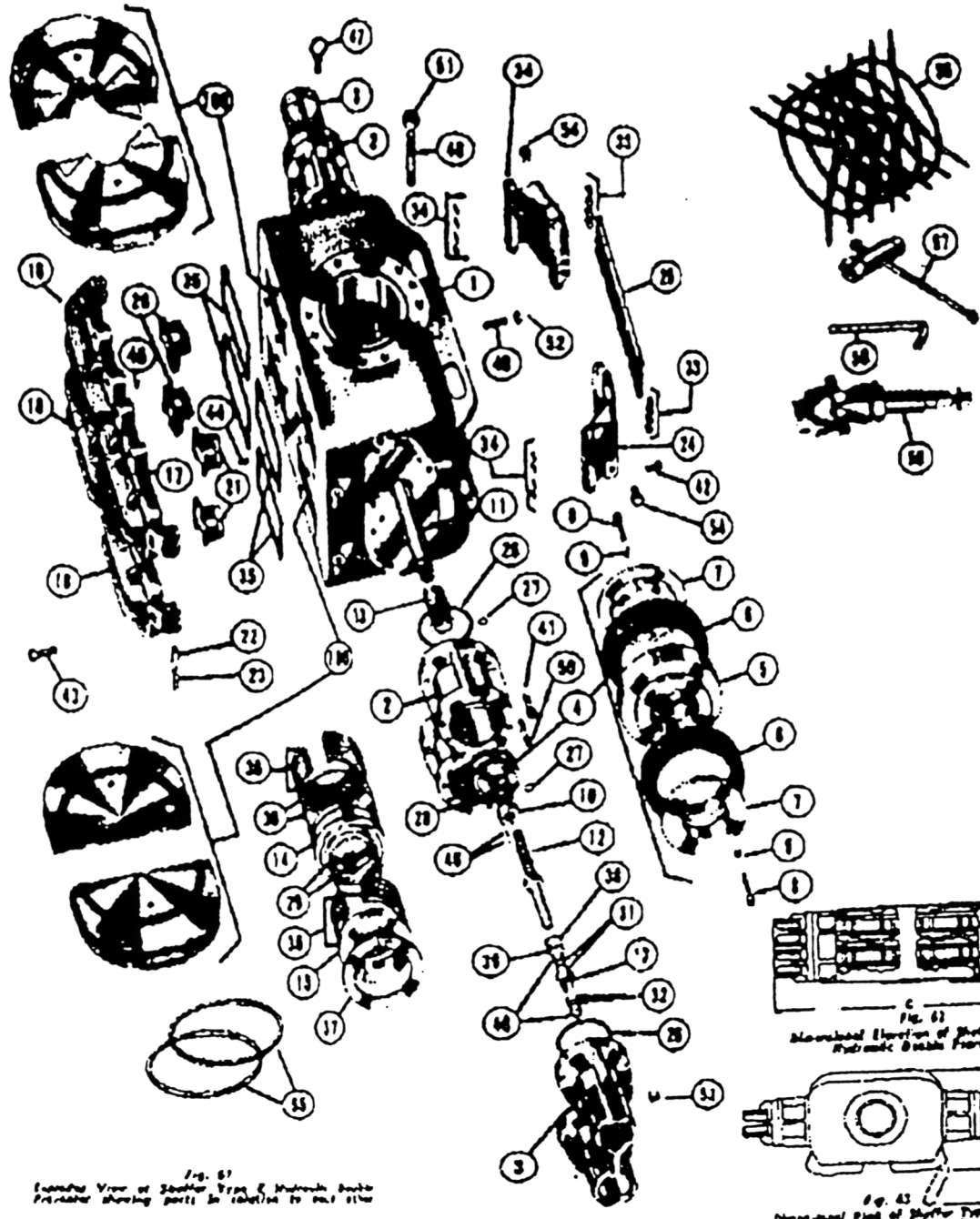
Note: Drilling operations will commence as soon as practical after approval of all necessary permits including the APD's.

B. Notification of Operations:

Rawlins Field Office, BLM
1300 North Third
Rawlins, Wyoming 82301
(307) 328-4200

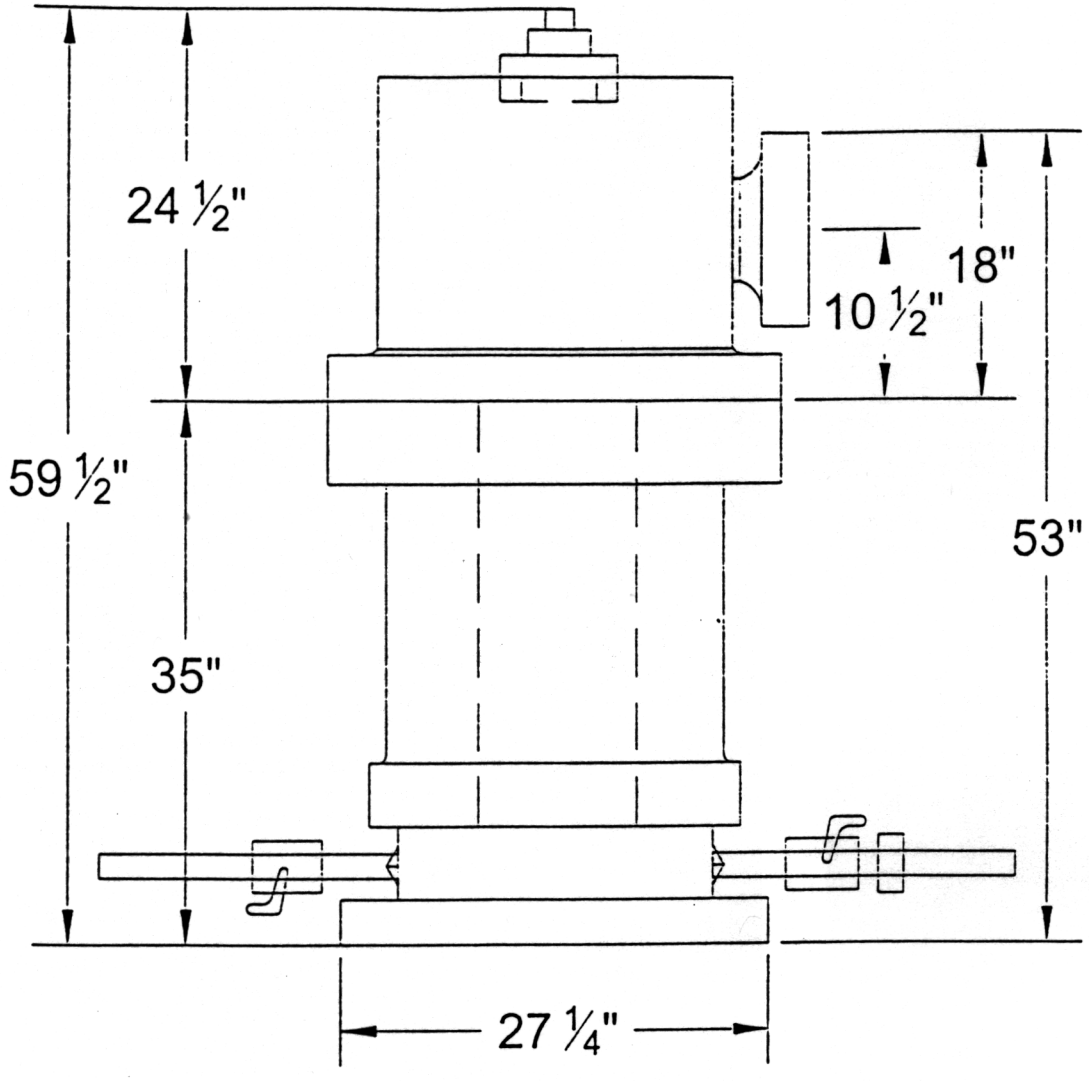
NL

SHAFFER HYDRAULIC BLOWOUT PREVENTERS
TYPE E DOUBLE PREVENTERS
(RISING LOCKING SHAFTS)



Size	Press. Rat	Test Press	Vertical bore
10"	3,000 psi	6,000 psi	11"

Hieght	width	Length	Close	open
27 1/2"	34 1/4"	80 1/8	3.25 gals	2.7 gals



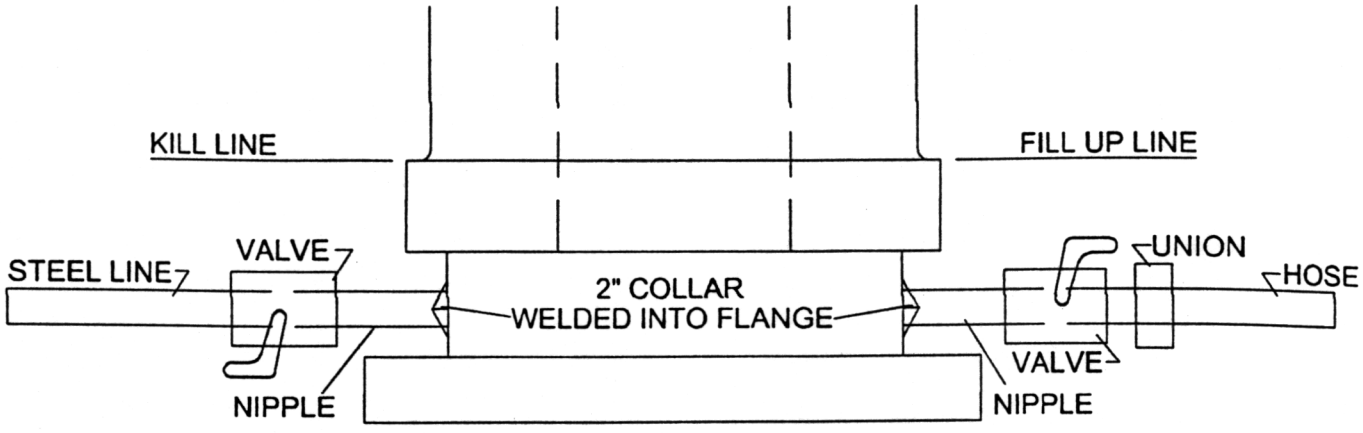
SPECIFICATIONS

10" - 900 FLANGES ON B.O.P.
10" - 900 FLANGE ON ROTATING HEAD
6" - 600 FLANGE ON FLOWLINE
2" - COLLAR ON EACH SIDE OF B.O.P. AT BOTTOM

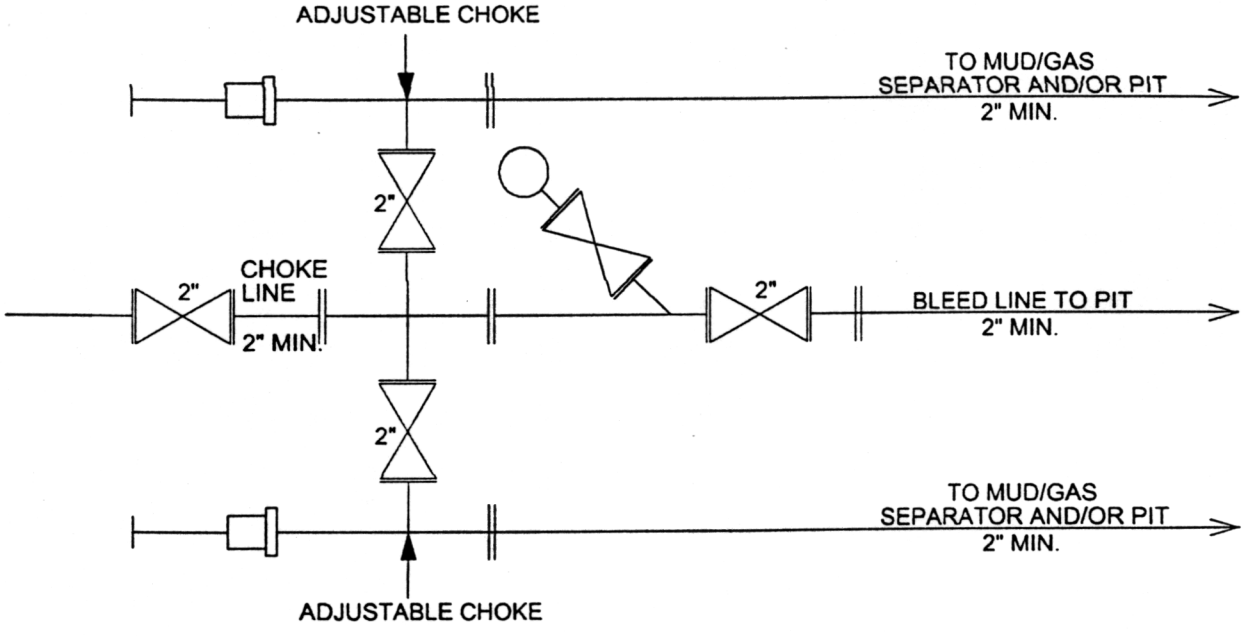
PETROLUEM DEVELOPMENT CORP.			
SCHEMATIC			
1500 P.S.I. REAGAN ANNULAR B.O.P.			
SCALE: AS NOTED	DATE: 05.04.01	DRAWN BY: MTM	FIGURE: 1

1172/Exhibit A

BOTTOM FLANGE ON ANNULAR B.O.P.



2M CHOKE MANIFOLD EQUIPMENT



SPECIFICATIONS

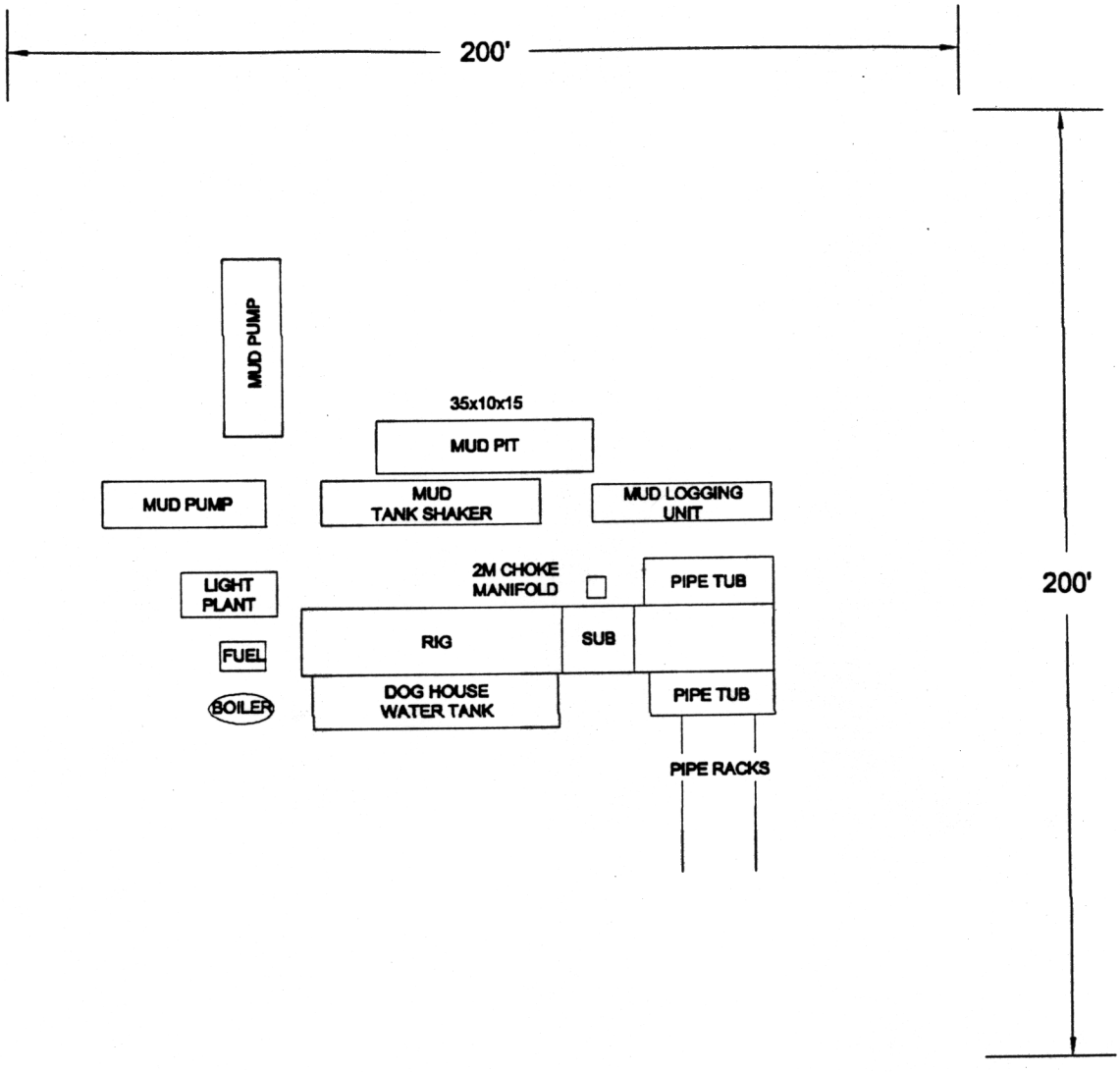
10" - 900 FLANGES ON B.O.P.
10" - 900 FLANGES ON ROTATING HEAD
6" - 600 FLANGE ON FLOWLINE
2" - COLLAR ON EACH SIDE OF B.O.P. AT BOTTOM

PETROLUEM DEVELOPMENT CORP.

SCHEMATIC

BOTTOM FLANGE ON ANNULAR B.O.P. &
2M CHOKE MANIFOLD EQUIPMENT

SCALE: as noted	DATE: 05.04.01	DRAWN BY: MTM	FIGURE: 2



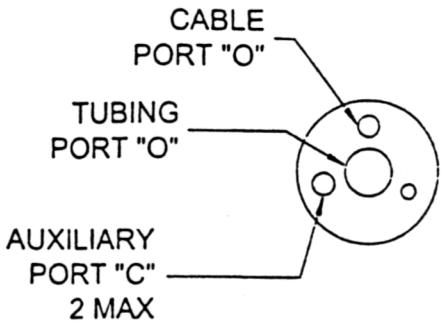
PETROLUEM DEVELOPMENT CORP.

TYPICAL DRILLSITE LAYOUT

SCALE: NTS	DATE: 5.18.01	DRAWN BY: ML	FIGURE: -

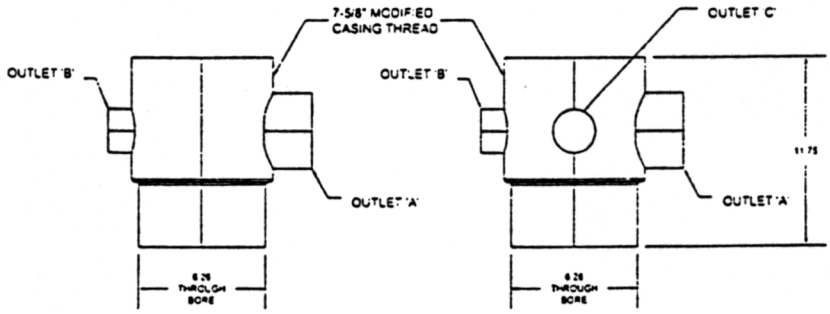
1172/Exhibit A

MANDREL STYLE



GS-3 / GS-4
CENTERED HANGER
WITH CABLE PORT &
UP TO 2 AUX PORTS

BODY STYLES



4 x 3 STYLE

4 x 2 STYLE

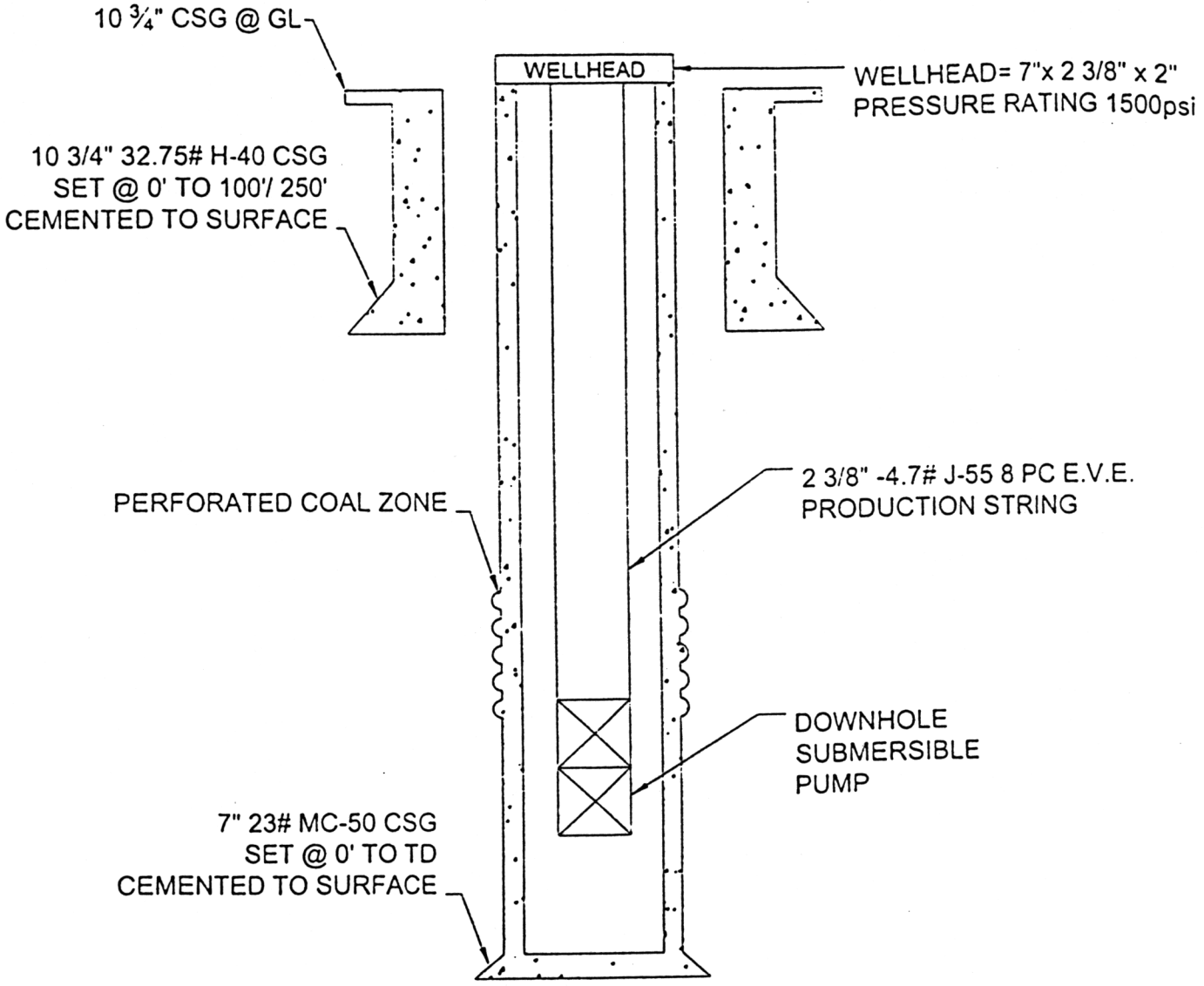
Standard Body Configurations				
Body Style	Bottom Connection	Outlet "A"	Outlet "B"	Outlet "C"
4 x 2	7" Short Casing (Male or Female)	4' LP Female	2" LP Female	NA
4 x 3	7" Short Casing (Male or Female)	4" LP Female	3" LP Female	NA
4 x 2 x 2	7" Short Casing (Male or Female)	4" LP Female	2" LP Female	2" LP Female

Standard Mandrel Configurations				
Mandrel Style	Port "C"	Port "D"	Port "E"	Approx Wt - LBS
GS-3	2-3/8" UPTBG Box Down X	1" LP	(1) 1/2" LP Box Up	26
GS-4	2-3/8" UPTBG Box Up	Box Up	(2) 1/2" LP Box Up	26

PETROLUEM DEVELOPMENT CORP.

CONFIGURATION OPTIONS

SCALE: NTS	DATE: 05.04.01	DRAWN BY: MTM	FIGURE:

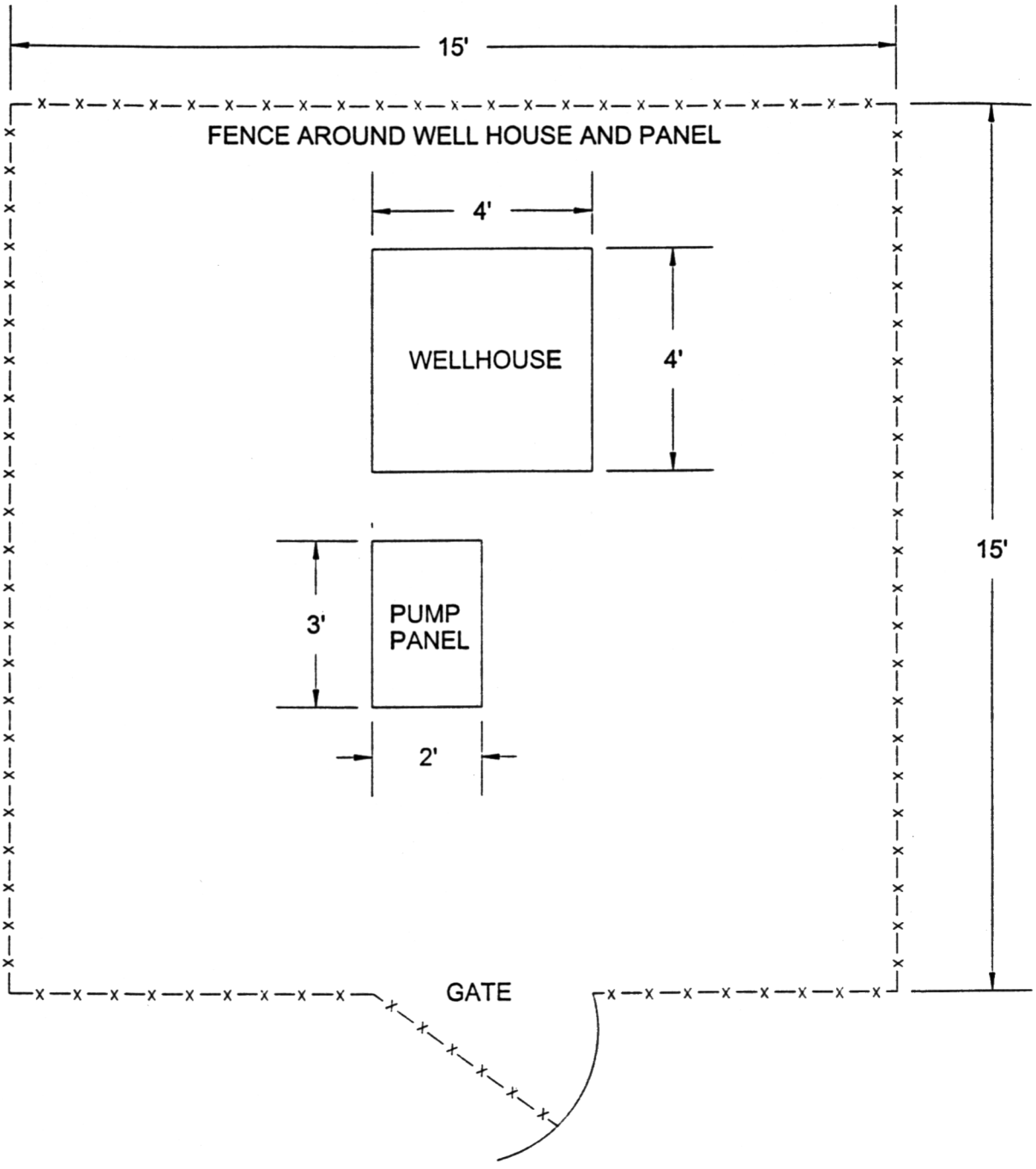


PETROLUEM DEVELOPMENT CORP.

TYPICAL CBM COMPLETED WELL

SCALE: NTS	DATE: 05.04.01	DRAWN BY: MTM	FIGURE: 4

1172/Exhibit A



PETROLUEM DEVELOPMENT CORP.

TYPICAL CBM WELL SITE

SCALE: NTS	DATE: 05.04.01	DRAWN BY: MTM	FIGURE: 5

1172/Exhibit A